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INTRODUCTION

Census and vital statistics data for the decade 1960-1970 show the pattern of population change in South Dakota to be of special interest to persons concerned with population dynamics in a rural state. For example, South Dakota reversed the small population increases recorded for the years 1940 to 1960, losing 15,007 persons (-2.2%) during the 1960-1970 decade. The State's total population in 1970 was 665,507. Further, from 1960 to 1970 the total number of rural residents in South Dakota declined 44,455 persons, and of this number 98.9% represented losses from that portion of the State's population living on farms or in communities of less than 1,000 inhabitants.

Regarding changes in fertility, the number of recorded live births declined continually from 1960 through 1968, when the recorded 11,408 births represented both the lowest number of births and the lowest crude birth rate (17.1) since 1907. Of special interest was the relative stability of the lowered birth rates from 1966 through 1970, the five reproductive years from which were generated those children born in South Dakota and reported as age 0-4 in the 1970 census (Appendix Table I).

Along with lowered fertility, the number of infant deaths under 1 year of age declined dramatically during the decade, especially from 1966 to 1970, when the infant mortality rate dropped from 24.6 per 1,000 live births to 19.5 per thousand (Appendix Table II). During the same 10-year period the death rate for children under 5 years of age dropped from 6.9 per 1,000 young children to 5.0 per thousand (Appendix Table III). Mortality figures for South Dakota's population as a whole reveal minor fluctuations during the decade in both the incidence and rates for death (Appendix Table IV).

Vital statistics recorded 11,034 marriages in 1970 for South Dakota, the greatest annual number ever reported since registration began in 1905 (Appendix Table V). This increase is principally due to the volume of nonresidents who came to South Dakota to marry and then returned to their home state following the ceremony. Although nonresident marriages explain much of the increase in nuptual events, the number of marriages between parties, both of whom are State residents, increased from 3,922 in 1961 to 5,128 in 1970, a 30.7% gain during the decade.

Finally, the pervasive pattern of out-migration of residents from South Dakota that started during the 1930s continued. From 1960 to 1970 the State lost 93,310 persons (−13.7%) due to the selective movement of residents who relocated to other states.

THE PROBLEM AND OBJECTIVES OF STUDY

Changes of such magnitude in the size, vital rates and spatial distribution of the population of a rural state generate questions regarding the possible impact of these changes on the age composition of the population of South Dakota from 1960 to 1970. Consequently, population specialists seek to determine how changes in migration, fertility, and mortality in an area are associated with changes in the age composition of the area. Further, demographers want to know what demographic components seem to explain why the age composition of a population varies from one area to another.

Consequently, this study investigated the following questions:

1. What changes in the composition of South Dakota's population for the age categories 0-4, 0-14, 15-34, 35-64, 65 plus and 75 and over occurred from 1960 to 1970?

2. How do these changes by age differ when analyzed according to residence, sex and race?

3. What is the association between the decline in the number of resident children under age five and changes in fertility, mortality and migration?

Research related to this question is important in that migration, fertility and mortality patterns concern human resources — their distribution, attributes and profiles. For instance, as Beegle, Marshall and Rice[1] concluded, out-migration from given counties over long periods of time conceivably may bring about unfavorable population compositions of such magnitude as to make unfeasible both the possibility of local industrialization and the relocation of persons from density centers to areas of declining population.

Further, knowledge of the association between selected demographic variables and the composition of the population in South Dakota may assist in the area planning and programming implemented by various governmental, educational, economic, recreational and religious agencies.

POPULATION CHANGE, AGE AND SELECTED DIFFERENTIALS

Examination of the gross population data for the 1960-1970 decade raises the question, "To what extent do changes in the population of South Dakota for the years 1960 and 1970 vary by age, and how is this variability by age related to such selected factors as planning districts, urban-rural residence, sex and race?"

This section of the study examines changes in the composition of the population of South Dakota for the decade 1960-1970 from the perspective of that question.

Changes by Age

Study of changes by age in the population composition of the State for the past decade, presented in graphic form (Figure 1), demonstrates that changes in the composition have not been uniform but variable.

For purposes of analysis the population data for the State have been aggregated into the following age categories: ages 0-4, 0-14, 15-34, 35-64, 65+ and 75+. Age intervals 0-4, and 75+ are treated as subsets of intervals 0-14 and 65 or more. A tabulation of the numerical and percent changes for South Dakota's population for the past decade by selected age categories is given in Table 1.

Analysis of Table 1 reveals that age category 0-4 experienced the largest percentage loss in population, with −34.7%. The next largest decline was in the age 0-14 youth category, recording a percentage loss of −13.6%. The loss for age category 35-64 was −4.3%

Three age categories gained in population from 1960 to 1970: age 15-34 young adults (9.5%), population over age 65 (12.5%), and the population age 75 or more (37.9%). The growth of the 15-34 young adult category of 16,076 represents the largest numerical increase for a selected age category.

Table 1. Population gains or losses and percent change for South Dakota by selected age categories, 1960-1970.

Age Category	1960 Total Population	1970 Total Population	Gain or Loss	Percent Gain or Loss
0- 4	83,127	54,258	−28,869	−34.7
0-14	228,482	197,398	−31,084	−13.6
15-34	169,631	185,707	16,076	9.5
35-64	210,888	201,918	−8,970	−4.3
65+	71,513	80,484	8,971	12.5
75+	24,402	33,647	9,245	37.9

Changes in Age by District

Examinations of changes by districts for the years 1960 and 1970 for each of the age categories (Table 2) shows numerical and percentage losses for each State planning district for age categories 0-4 and 0-14.

The largest loss for age category 0-14 was in District I with −23.1%. Districts III, IV and V had a mean loss of −15.7% in the 0-14 age group. Districts II and VI, with the urban centers of Sioux Falls and Rapid City, and with several college and university institutions, showed percentage losses of −7.3 and −7.8.

In the 0-4 young child category, Districts I, V and VI showed percentage losses of −42.3, −36.8 and −46.8 and Districts II, III and IV −29.8, −35.1 and −35.6, respectively. This suggests a general decline of some magnitude in the size of the 0-4 cohort throughout the State.

Study of the young adult category age 15-34 revealed interesting variations. District V showed a percentage loss of −6.4. All other dis-

[1]Allan Beegle, Douglas Marshall and Roger Rice, "Selected Factors Related to County Migration Patterns in the North Central States, 1940-1950 and 1950-1960," **Quarterly Bulletin,** 46, 2:223, Nov., 1963.

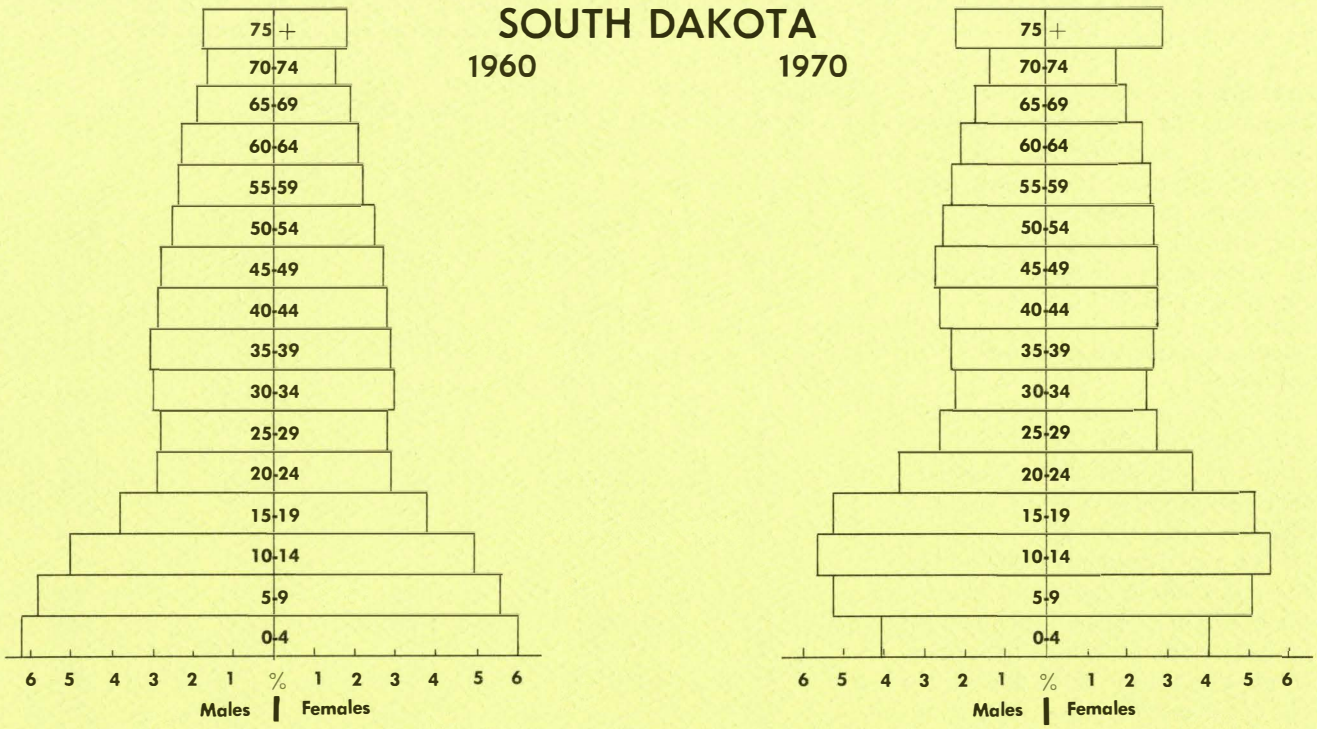

Figure 1. South Dakota Population By Age: 1970 and 1960. (From: Marvin P. Riley and others, "The Age and Sex Structure of the Population of South Dakota, 1969 and 1970." Brookings, S. D.: Agricultural Experiment Station, South Dakota State University, Bulletin 599, 1970 Population Series Report No. 3, June, 1972, p. 16.)

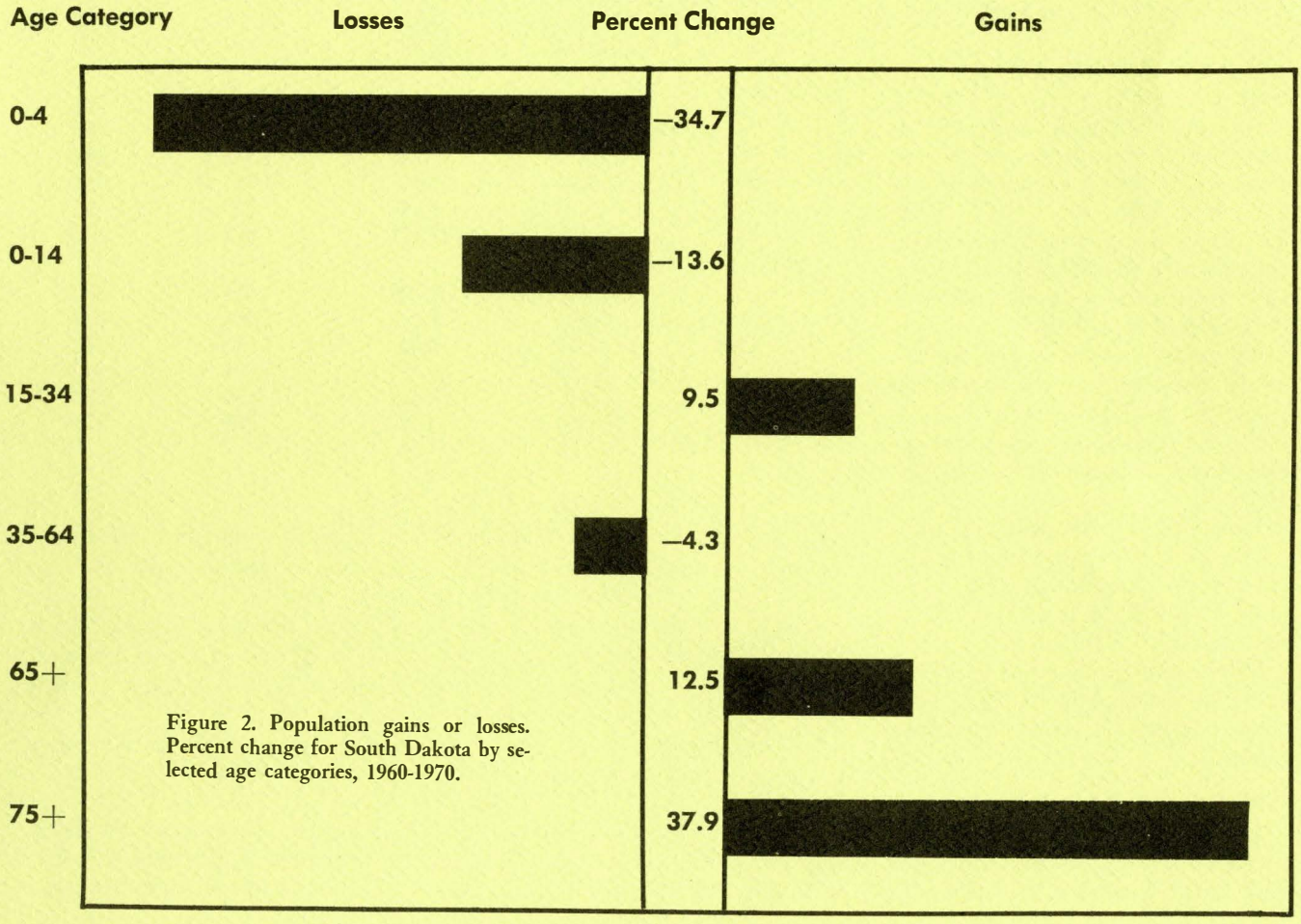

Figure 2. Population gains or losses. Percent change for South Dakota by selected age categories, 1960-1970.

tricts showed percentage gains for the age category, with District II reporting a gain of 23.5%. The older adult category 35-64 had percentage losses for each district except Districts II and VI. All districts showed increases in number and percentage measures for the age categories 65 plus and 75 or older, the percentage changes ranging from 9.7% to 46.6%.

Changes by Age, Urban-Rural Residence

The rural farm and small hamlet population (under 1,000 inhabitants) declined from 1960 to 1970 in the age category 0-14 by –21.8% (Table 3), and the number of persons in that category dwelling in towns of 1,000 to 2,499 dropped by –10.4%. The urban population showed a percentage loss for urban communities of 10,000 to 49,999.

Large percentage losses were experienced in all residence segments of the young child age 0-4 population for 1960 to 1970, ranging from –17.1% for urban communities of 2,500 to 9,999 inhabitants to –40.9% for the rural farm and hamlet population.

Substantial numerical and percentage gains were shown for age category 15-34 for all residence segments of the population except rural farm and hamlet, which showed a loss of –9.2%. The large 42.6% growth in this age category in the urban towns of 2,500 to 9,999 probably reflects the relocation of rural persons to urban areas.

All urban residence segments had small numerical and percentage gains for the age category 35-64, and rural farm areas and communities showed losses in this age category.

Percentage gains ranging from 5.6% to 29.7% were shown for the age category 65 plus and in all residence segments of the State for the 1960 to 1970 period.

Substantial percentage gains up to 60.4% occurred in the age 75 or more category for all residence segments.

Changes in Age by Sex

Examination of changes by age and sex (Table 4) for the State from 1960 to 1970 reveals that although age categories 0-4 and 0-14 showed mean percentage losses of –34.7% and –13.6%, respectively, adjustments in the sex ratio (number of men to every 100 women) for these categories were nil in the 0-14 grouping and a slight –0.4 in the 0-4 age grouping.

Changes in the young adult 15-34 category from 1960 to 1970 showed a minor decline of –0.5 in the sex ratio compared to a mean increase of 9.5% in that age group.

The age category 35-64 showed a sex ratio change of –5.2, which appears related to a –6.7% loss in the male population for that age group.

The advanced age categories 65 plus and 75 or more showed declining sex ratios in 1970 of 83.1 and 75.7 respectively, with corresponding disproportionate increases of 22.4% and 53.0% for the female populations in those age categories, a phenomena apparently related to differential mortality by sex.

Table 2. Population gains or losses and percent change for South Dakota by selected age categories and residency by planning district, 1960-1970.

District Residence Category by Age	1960 Total Population	1970 Total Population	Gain or Loss	Percent or Loss
0-4				
I	12,023	6,940	–5,083	–42.3
II	16,704	11,724	–4,980	–29.8
III	11,639	7,558	–4,081	–35.1
IV	13,861	8,928	–4,933	–35.6
V	11,892	7,520	–4,372	–36.8
VI	17,008	11,588	–5,420	–46.8
0-14				
I	34,192	26,304	–7,888	–23.1
II	45,977	42,623	–3,354	–7.3
III	33,016	27,781	–5,235	–15.9
IV	39,874	33,436	–6,438	–16.1
V	31,637	26,862	–4,775	–15.1
VI	43,786	40,392	–3,394	–7.8
15-34				
I	25,367	27,848	2,481	9.8
II	35,071	43,304	8,233	23.5
III	23,927	24,572	645	2.7
IV	28,705	30,446	1,741	6.1
V	21,491	20,115	–1,376	–6.4
VI	35,070	39,422	4,352	12.4
35-64				
I	33,458	29,859	–3,599	–10.8
II	43,641	43,819	178	.0
III	33,361	30,847	–2,514	–7.5
IV	38,909	35,885	–3,024	–7.8
V	25,113	23,984	–1,129	–4.5
VI	10,406	37,524	1,118	3.1
65+				
I	12,580	13,854	1,274	10.1
II	14,691	16,908	2,217	15.1
III	12,880	14,228	1,348	10.5
IV	13,384	15,327	1,943	14.5
V	7,289	7,996	707	9.7
VI	10,689	12,171	1,482	13.9
75+				
I	4,299	5,990	1,691	39.3
II	5,115	7,213	2,098	41.0
III	4,599	6,061	1,462	31.8
IV	4,284	6,291	1,997	46.6
V	2,517	3,156	639	25.4
VI	3,588	4,946	1,358	37.9

Changes in Age by Race

Analysis of changes in age by race (Table 5) for the State from 1960 to 1970 shows a general number and percentage increase in all age categories for non-whites. The race ratio, the number of whites for every 100 non-whites, shifted from 1,720 to 930 and 1,820 to 1,170 in the 0-4 and 0-14 age categories. Stated another way, there were 10.8 non-whites for every 100 whites in age interval 0-4 in 1970 compared to 5.81 in 1960, and 8.55 non-whites for every 100 whites in age category 0-14 in 1970 compared to 5.49 in 1960. Declines in the race ratio also occurred in the active population categories 15-34 and 35-64 and in the 65 plus group. The only age group not showing a decline in the race ratio was the age category 75 or more, which showed an increase of 380 in the number of whites to every 100 non-whites. Particularly significant is the increase of 31.1% in the number of whites age 15-34 when contrasted to the decrease of —37.6% in the number of whites, 0-4, especially when compared to the non-white increase of 8.5% and 15.0%, respectively, for those age groupings. It suggests the possible differential effects of race as a factor explaining changes in the number of young children 0-4 between 1960 and 1970 for South Dakota.

Summary of Changes by Age

The data show that age category 0-4 experienced the largest percentage decline from 1960 to 1970. When examined according to planning district, the loss in this category was more pronounced in the northeastern and western areas of South Dakota and of higher magnitude than any other age category in all districts. The 0-4 cohort showed a percentage decline in all urban-rural residence categories. Change in the sex ratio for the interval was negligible; however, the number of non-whites in this young child category increased substantially during the decade, perhaps the result of continued high non-white fertility.

The age category 0-14, representing the child dependent population, showed the second largest decline in the State for the decade, a fact related to the presence of the young child category 0-4 as a sub-set of this group. All of the planning districts showed losses for this interval, the smallest occurring in Districts II and IV. This small loss for these districts appears related to the percentage gains experienced in this age category for urban areas. Additional growth was revealed in

Table 3. Population gains or losses and percent change for South Dakota by selected age categories and urban-rural residence, 1960-1970.

Residence Category by Age	1960 Total Population	1970 Total Population	Gain or Loss	Percent or Loss
0-4				
Total Urban	33,524	24,413	–9,111	–27.2
Urban Area	8,513	6,406	–2,107	–24.8
10-50,000	16,614	11,050	–5,564	–33.5
2,500-9,999	8,397	6,957	–1,440	–17.1
Total Rural	49,603	29,845	–19,758	–39.8
1,000-2,499	5,670	3,868	–1,802	–31.8
Other Rural	43,933	25,977	–17,956	–40.9
0-14				
Total Urban	87,426	84,497	–2,929	–3.4
Urban Area	22,496	22,685	189	.1
10-50,000	42,292	38,016	–4,276	–10.1
2,500-9,999	22,638	23,796	1,158	5.1
Total Rural	141,056	112,901	–28,155	–20.0
Rural, 1,000-2,499	15,935	14,272	–1,663	–10.4
Other Rural	125,121	98,629	–26,492	–21.8
15-34				
Total Urban	74,171	97,195	23,024	31.0
Urban Area	18,150	23,577	5,427	29.9
10-50,000	36,939	46,411	9,472	25.6
2,500-9,999	19,082	27,207	8,125	42.6
Total Rural	95,460	88,512	–6,948	–7.3
1,000-2,499	11,597	12,402	805	6.9
Other Rural	83,863	76,110	–7,753	–9.2
35-64				
Total Urban	78,564	83,328	3,764	4.8
Urban Area	20,609	22,153	1,544	7.5
10-50,000	36,172	37,688	1,516	4.2
2,500-9,999	21,783	22,487	704	3.2
Total Rural	132,324	119,590	–12,734	–9.6
1,000-2,499	17,143	16,121	–1,022	–6.0
Other Rural	115,181	103,469	–11,712	–10.2
65+				
Total Urban	27,019	32,608	5,589	20.7
Urban Area	6,063	7,591	1,532	25.3
10-50,000	11,527	14,945	3,418	29.7
2,500-9,999	9,429	10,072	643	6.8
Total Rural	44,494	47,876	3,382	7.6
1,000-2,499	8,966	10,361	1,395	15.6
Other Rural	35,528	37,515	1,987	5.6
75+				
Total Urban	9,506	14,426	4,920	51.8
Urban Area	1,990	3,174	1,184	59.5
10-50,000	4,046	6,490	2,444	60.4
2,500-9,999	3,470	4,762	1,292	37.2
Total Rural	14,896	19,221	4,325	29.0
Rural, 1,000-2,499	3,335	4,807	1,472	44.1
Other Rural	11,561	14,414	2,853	24.7

this category for that portion of the population resident in small urban towns of 2,500 to 9,999. There was no change in the sex ratio for the 0-14 age group; however, the number of non-whites increased in this age category.

The third age category experiencing percentage losses during the decade for the State as a whole was the age 35-64 segment of the population, which had a small decline. This decline occurred in all districts except Districts II and VI. When the decline was controlled for urban-rural residence, all urban segments of the group showed a growth, whereas all rural elements recorded a decline. The sex ratio for the category declined moderately, the apparent result of differential mortality or possible selective migration of males. The race ratio showed a moderate to high increase in the number of non-whites, an increase probably related to the selective migration of whites from South Dakota and residential permanence associated with reservation life and tribal membership.

The young adult category 15-34 increased in size from 1960 to 1970, showing numerical and percentage growth in all planning districts except District V. Districts II and VI, while showing declines in the young child and child dependent age categories, had the largest increase in the young adult population.

Examination of changes in the young adult group by urban-rural residence revealed that the increase in this segment of the population occurred primarily in urban communities and principally in urban places of less than 10,000. Whereas the rural population age 15-34 declined in aggregate, rural communities of 1,000 to 2,499 experienced low to moderate growth in this age segment. Changes in the sex ratio were negligible, and the number of non-whites 15-34 increased slightly.

The aged dependent population (65 and over) increased 12.5% from 1960 to 1970 for the State as a whole. Further, this segment of the population increased primarily in urban places of 10,000 to 50,000.

The sex ratio dramatically dropped 19.0 points from 1960 to 1970, a decline probably due not so much to differential mortality, but the selective migration of widowers and bachelors from the State in that are grouping.

The race ratio showed a slight increase in the number of non-whites age 65 and over, resulting apparently from selective migration opportunities for white retirees and the mobility restrictions associated with reservation life.

The category of persons 75 and over increased 37.9% and in all residential categories. The decline in the sex ratio was –18.7 points for the decade; the race ratio increased 380.

The general loss in the age 0-4 interval from 1960 to 1970 recorded for South Dakota, the planning districts, and for selected urban-rural residence segments provides an arena for further demographic study. This is especially so when compared with the increase in the number of young adults 15-34, the general net out-migration pattern for the State, the continuing rural depopulation and urbanization, and the decline in both fertility and infant and child mortality rates.

Table 4. Population gains or losses, percent change and sex-ratio change for South Dakota by selected age categories and sex, 1960-1970.

Age Category by Sex	1960 Population	1970 Population	Number Gain or Loss	Percent Gain or Loss	Sex Ratio for Age Category 1960	Sex Ratio for Age Category 1970	Net Change in Sex Ratio for Age Category, 1960-1970
0-4					103.7	103.4	–.4
Male	42,328	27,587	–14,741	–34.8			
Female	40,799	26,671	–14,128	–34.6			
0-14					103.7	103.7	.0
Male	116,333	100,513	–15,820	–13.6			
Female	112,149	96,885	–15,264	–13.6			
15-34					100.3	99.8	–.5
Male	84,937	92,740	7,803	9.2			
Female	84,694	92,967	8,273	9.8			
35-64					103.8	98.6	–5.2
Male	107,399	100,262	–7,137	–6.7			
Female	103,489	101,656	–1,833	–1.8			
65+					99.1	83.1	–16.0
Male	35,602	36,518	916	2.6			
Female	35,911	43,966	8,055	22.4			
75+					94.4	75.7	–18.7
Male	11,850	14,438	2,588	21.8			
Female	12,552	19,209	6,657	53.0			

Table 5. Population gains or losses, percent change and race-ratio change for South Dakota by selected age categories and race, 1960-1970.

Age by Race	1960 Total Population	1970 Total Population	Gain or Loss	Percent Gain or Loss	Race Ratio by Age, 1960	Race Ratio by Age, 1970	Net Change in Race Ratio by Age 1960-1970
0-4					1,720	930	–790
White	78,556	49,002	–29,554	–37.6			
Non-white	4,571	5,256	685	15.0			
0-14					1,820	1,170	–650
White	216,612	181,838	–34,774	–16.1			
Non-white	11,870	15,560	3,690	31.1			
15-34					1,960	1,650	–310
White	161,385	175,117	3,690	31.1			
Non-white	8,246	10,590	13,732	8.5			
35-64					3,510	2,680	–830
White	205,040	194,700	–10,340	–5.0			
Non-white	5,848	7,218	1,370	23.4			
65+					4,830	4,360	–470
White	70,061	78,678	8,617	12.3			
Non-white	1,452	1,806	354	24.4			
75+					4,710	5,090	380
White	23,895	32,999	9,104	38.1			
Non-white	507	648	141	27.8			

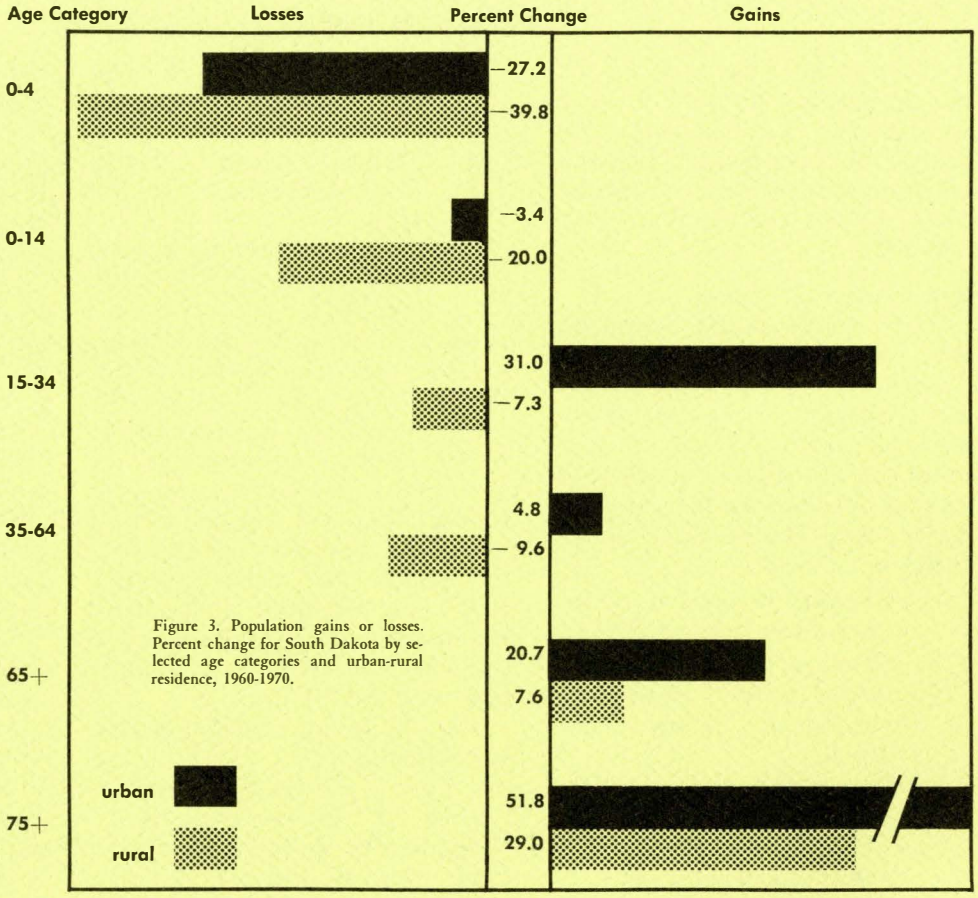

Figure 3. Population gains or losses. Percent change for South Dakota by selected age categories and urban-rural residence, 1960-1970.

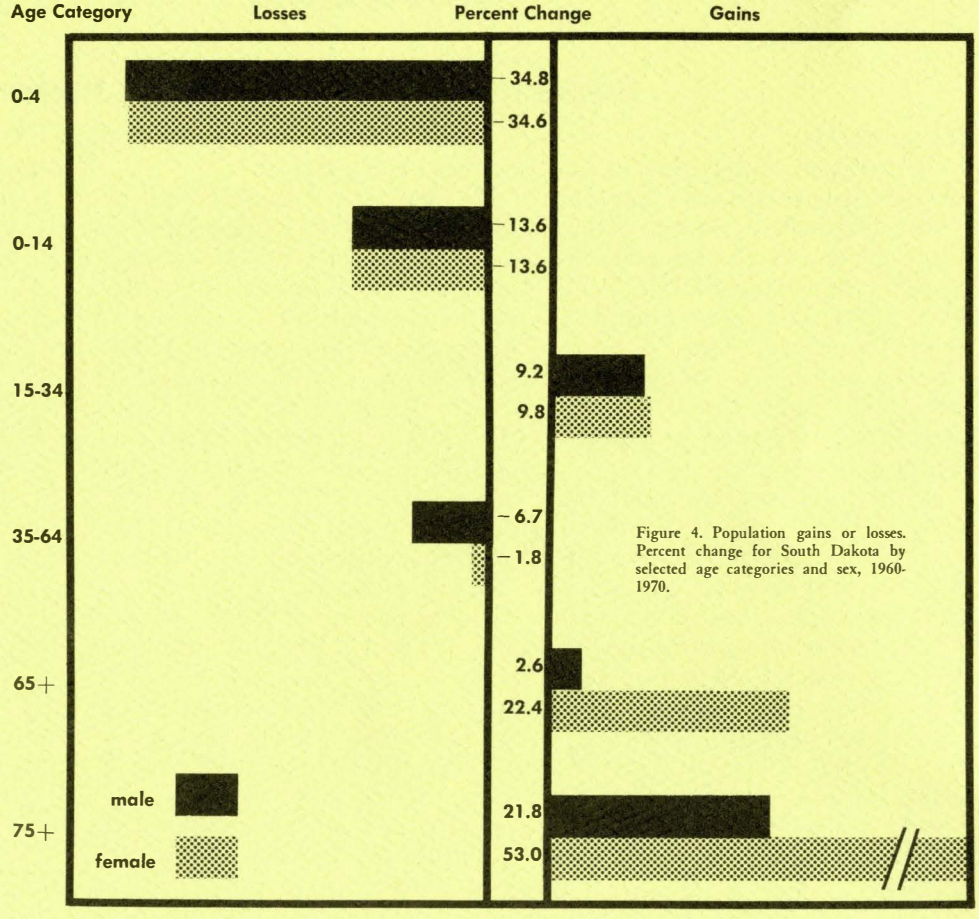

Figure 4. Population gains or losses. Percent change for South Dakota by selected age categories and sex, 1960-1970.

DECLINE IN CHILDREN UNDER FIVE

This section of the study reports the association[2] between selected demographic variables and the change in the number of young children under 5 years of age for South Dakota for the years 1960 and 1970.

Hypothesis and Findings

Eight demographic variables were designated X_1 through X_8. They were defined as the plus or minus change from the year 1960 to the year 1970 by South Dakota counties in the number of events or persons specified as belonging to the variable. The specified set for each variable was:

X_1 = Changes in number of recorded live resident births,

X_2 = Changes in number of recorded resident deaths occurring to children under age 5,

X_3 = Changes in number of females age 15-44,

X_4 = Changes in number of young adult females age 15-34,

X_5 = Changes in number of net migrants,

X_6 = Changes in number of rural farm residents and residents of towns under 1,000,

X_7 = Changes in number of white young adult females age 15-34,

X_8 = Changes in number of non-white young adult females age 15-34.

In addition to the above independent variables, the size of the largest incorporated place in 1970 in the county (X_9) was included in order to test the association of the size of the largest county community with observed changes in the number of children under age 5.

Therefore, the dependent variable Y was the plus or minus number change in young children under age 5 in South Dakota by county from 1960 to 1970.

The following null-hypothesis was formulated:

The set of independent variables will not contribute significantly to the explanation of the variation observed in the dependent variable.

Stated descriptively in rank order of importance, the findings were that within the context of the specified set of independent variables: changes in the number of recorded live resident births (X_1), changes in the number of recorded resident deaths occurring to children under age 5 (X_2), changes in the number of non-white young adult females age 15-34 (X_8), the size of the largest incorporated place in the county in 1970 (X_9), changes in the number of females age 15-44 (X_3), changes in the number of young adult females age 15-34 (X_4), and changes in the number of net migrants (X_5) explain 98.1% of the variations observed in the number of children under age 5(Y).

Changes in the number of rural farm residents and inhabitants of hamlets under 1,000 inhabitants (X_6), and changes in the number of white young adult females age 15-34 (X_7) did not contribute significantly to the explanation of the variation observed in the dependent variable (Y).

The statistical findings are given in Appendix Table VI.

SUMMARY, CONCLUSIONS AND IMPLICATIONS

Changes by Age

The first part of this study examined the changes that have occurred in the composition of South Dakota's population for the decade 1969-70 in the age categories 0-4, 0-14, 15-34, 35-64, 65 and over and 75 or more. It was found that:

1. Changes in the population of South Dakota from 1960 to 1970 by selected age categories varied considerably.

2. The largest loss occurred in the young child interval age 0-4, followed respectively by smaller losses in the 0-14 youth category and the age 35-64 older active adult population.

3. Three age categories gained in population from 1960 to 1970: the 15-34 young adult segments, the population over age 65, and the segment 75 years or more in age. The largest number was in the age 15-34 young adult group, and the largest percent gain in the age category 75 or more.

These findings suggest the following conclusions:

1. The increase of 16,076 inhabitants recorded from 1960 to 1970 in South Dakota for the young adult category 15-34 appears as a function of the processional advance of the population segment age 5-24 in 1960, a cohort which was the product of the post-war "baby boom." The segment age 5-24 numbered 236,585 in 1960. In 1970, this same segment, now age 15-34, was 185,-707 in number. These data mean that even though this age category 15-34 increased 16,076 in number in 1970 compared to 1960, the increase was not due to net in-migration. In fact, the loss of 50,578 persons (−21.5%) for the age group 15-34 in 1970 from its cohort age 5-24 base in 1960 was of such magnitude that it suggests substantial selective out-migration of young adults from the State during the past decade.

2. The increase in the number of persons over age 65 and 75 or more for South Dakota from 1960 to 1970 appears as a function of the processional advance of those portions of the population age 55 or more and 65 and over in 1960, subject, of course, to losses from mortality and migration. The open-ended feature of these categories does not permit refined cohort comparison. However, it should be noted that in 1960 the populations of 26,091 for age cohort 65-69 and 21,020 for the age cohort 70-74 were the largest in the history of South Dakota. From these large cohorts were generated over the decade the age group 75+

[2]For the purpose of testing the association between the variables a step-wise least squares multiple regression analysis was used. For each selected variable the absolute plus or minus change in the actual numerical values for 1960 and 1970 was used as a measure of the demographic process. The association between the variables was tested at the .05 level of significance.

in 1970. Consequently, the changes from 1960 to 1970 in the number of persons 65 and over and 75 or more in South Dakota appears associated with the fact that:

A) the 1960 age cohort 65-74 may be assumed to constitute the bulk of the group in 1970 classified as 75 plus, and

B) The age interval 75 or more is a sub-set of the category 65 plus.

3. The loss in the number of young children under age 5 appears as a result of declining birth rate, selective migration, rural depopulation, and continued urbanization. Since the age 0-4 interval was a subset of the age 0-14 child segment of the population, and since the dramatic leveling of lowered fertility in South Dakota did not begin until 1966, it is assumed that the decline in the 0-14 category from 1960 to 1970 is accounted for principally by the decline in the number of young children under age 5 and secondly by the selective out-migration of the parental cohorts for the 0-14 age group.

Differences in Changes by Age

This study examined the variations in the changes observed in the selected age categories when controlled for residence, sex and race differentials. It was found that:

1. Changes by district for each of the age categories for the years 1960 to 1970 were similar to the variations observed by age categories for the State as a whole.

2. The segments of the population residing in urban areas showed gains in all age categories except the children age 0-14 and under age 5.

3. The segments of the population residing in rural areas showed losses in all age categories except those age 65 and over and 75 plus.

4. The number of children under age 5 declined substantially from 1960 to 1970 in all residence categories, both urban and rural.

5. The number of young adults age 15-34 increased from 1960 to 1970 in all urban residential categories.

6. The number of persons age 65 and more and 75 or over increased from 1960 to 1970 in all residential categories, both urban and rural.

7. The sex ratio lowered markedly in age categories 65 and over and 75 or more from 1960 to 1970.

8. The number of non-whites in proportion to whites increased in all age categories except 75 or more from 1960 to 1970.

CONCLUSIONS

The variations observed in the changes by age in the population composition for South Dakota from 1960 to 1970 when controlled by selected differentials suggest the following conclusions:

1. Variations in the changes of the population of the selected age categories from 1960 to 1970 for South Dakota were not meaningful when analyzed by Planning District, but were found to be associated with urban-rural residence distribution by size and type of place for the State as a whole. This statement generates the following subconclusions:

A. Urban communities in South Dakota from 1960 to 1970 appeared to have greater ability to attract newcomers and retain population levels than did rural communities and farm areas for both the active (age 15-64) and age 65+ populations. This phenomenon was probably associated with:

(1) The greater occupational diversity and opportunity available to the active population, normally associated with urban communities.

(2) The greater medical, retirement and service facilities available for the age dependent population, normally associated with urban communities, particularly centers over 10,000 inhabitants.

(3) The pervasive expansion of the urban culture, especially as an aspect of mass media, economic centralization, school consolidation and improved transportation.

B. Rural areas in South Dakota were subject to continued depopulation of increasing magnitude for the active population (15-64), particularly from farm residences and hamlets under 1,000 inhabitants. This phenomenon was apparently a result of selective relocation of the active population, probably associated with the decline in farm families and operators from 1960 to 1970, the closing of public schools in rural hamlets, and declining mercantile markets in these areas.

C. The numerical and percentage gains for rural age dependent populations (65+) is a function of the processional advance of age cohorts and not the consequence of rural repopulation by persons in this age group. The substantial increases from 1960 to 1970 reflected for the age dependent population in urban areas support this conclusion.

D. The number of young children under age 5 and the child dependent population (0-14) generally has declined substantially for all residential segments. This appears associated with the selective redistribution of the active population from rural to urban areas.

2. Changes in the composition of the population of South Dakota by age and sex from 1960 to 1970 were a function of selective voluntary migration and differential mortality. The relative stability in the sex ratio of the under age 5 cohort and the child dependent population (0-14) is an ascribed constant associated with the fact that the residence for members of these age groups is generally not voluntary but rather a consequence of parental decision.

The slight change in the 15-34 young adult category appears associated with higher male mortality, the fact that young adult males were eligibile for non-voluntary military service, and that young adult males may attend out of state colleges and universities in disproportionate number. Military personnel and

college students are enumerated at their place of military or college residence and not their legal residence. The variant decline by sex in the number of persons 35 to 64 years of age supports the conclusion given above regarding the selectivity of mortality and migration, as do the differentiated mortality common to the aged dependent population (65+) and the probable selective migration from the State of rural widowers and aged bachelors.

3. The increase in the number of non-whites in proportion to whites in South Dakota from 1960 to 1970 for all age segments except the interval 75 plus was a function of differential fertility according to race, the convergence of differential mortality by race, the selective migration from the State of better educated whites, and the greater mobility restrictions that impinge upon reservation residents. The decline in the proportion of non-whites to whites in the age category 75 plus appears associated with lower life expectancies and higher mortality at this age for S. D. non-whites.

Decline in Children Under Five

Finally, this study looked at the extent to which changes in migration, fertility and mortality were associated with the changes in the number of young children under age 5 in South Dakota for the years 1960 to 1970.

Seven independent variables were found to contribute significantly to the explanation of the variations observed in the number of children under age 5 (Y) for South Dakota by county from 1960 to 1970.

Stated in order of importance, it was found that for South Dakota from 1960 to 1970 variation in the decline in the number of young children under age 5 can be explained in rank order of importance by:

1. Declines in the number of recorded live resident births (X_1).
2. Increases in the number of recorded resident deaths occurring to children under age 5 (X_2).
3. Declines in the number of non-white females age 15-34 (X_8).
4. The relative greater size of the largest incorporated place in the county in 1970 (X_9).
5. Declines in the number of females age 15-44 (X_3).
6. Increases in the number of young adult females age 15-34 (X_4).
7. Increases in the number of net out-migrants from the State (X_5).

Interpretation of the above findings presents a strong case for concluding that the decline in the number of young children under age 5 for South Dakota from 1960 to 1970 is principally the result of changing fertility patterns on the part of the female population, particularly declines in the number of births occurring to young adult resident females 15-34 years of age. When examined according to the specified controls, the findings further suggest that non-white females age 15-34 have maintained relatively higher fertility rates than the white young adult females age 15-34. This is demonstrated by the fact that changes in the number of non-white adult females age 15-34 were significant when explaining variation in the changes in the number of children under age 5, whereas changes in the number of white adult females age 15-34 were not.

The findings also suggest that women in the upper reproductive age have maintained relatively higher fertility experience than have young adult females age 15-34. The fact that declines in the number of women age 15-44 are positively associated with declines in the number of children age 0-4, whereas decreases in the number of young adult women age 15-34 are negatively associated with declines in the number of young children under age 5, supports this conclusion.

Implications for South Dakota

A review of the findings and conclusions raises certain questions regarding the implications of these findings for South Dakota and its future. Some major implications may be stated as follows:

1. The decline in fertility from 1960 to 1970 and the degree to which this decline served to explain the loss in the number of children under age 5 implies that changes in desired family size are occurring in South Dakota consistent with such socio-economic value changes as may be occurring in the larger United States population.

This observation suggests that the convergence of rural-urban fertility patterns occurred in South Dakota about 1966 and may be an indicator of potential cultural convergence in other elements of urban-rural culture as the State continues urbanization. Further, the decline in fertility during a period when the number of marriages between South Dakota residents increased would suggest the use of relatively new contraceptives such as the "pill" with greater frequency by couples in South Dakota as part of their family planning program.

2. The fact that the location or absence of a State university or college in a county appears a factor associated with the variation in the population gains experienced by a county from 1960 to 1970, and the fact that the loss of young adults age 15-34 was not sufficient to show a minus loss in that age category, suggest that the increased enrollments in our colleges and universities from 1960 to 1970 (estimated to be a gain of 10,000 students) accounts in part for the increase experienced in South Dakota from 1960 to 1970. This would imply that institutions of higher learning have some "holding power," or at least serve as temporary "dams," when associated with migrancy; or that higher education places a moratorium on the age at which persons migrate from South Dakota.

3. The fact that the young adult group age 15-34 experienced a number and percentage gain from 1960 to 1970 (even though the increase was primarily explained by the processional advance of larger 1960 younger cohorts into that age category by 1970) suggests that economic conditions in the nation as a whole during the late 1960s' were such as to stem the flow of young adult migrants from the State. If this were not the case, it would have to be assumed that approximately 8,000 new job opportunities were generated in the State from 1960 to 1970 to provide employment for at least the increase in the male portion of the age 15-34

young adult population. In a period of decreasing population, continuing reduction in the number of farms and farm operators, and declining economic activity, such an assumption lacks adequate support. On the other hand, South Dakota during the past decade indeed may be providing employment and education opportunities for young adults in greater magnitude than previously.

4. The large increase from 1960 to 1970 in the age dependent population (65+) suggests that additional services and facilities for the aged may be required in South Dakota communities during the next decade, particularly for females and for non-whites.

5. The fact that the variation in the number of young adult women age 15-34 was inversely related to the variation in the number of children under age 5 from 1960 to 1970 suggests that in the next decade as the number of older reproductive women advance out of the reproductive ages, the number of young children under age 5 to the proportion of the total population will decline even more.

6. As a result of continuing urbanization and rural depopulation, urban communities in South Dakota, especially centers over 10,000 will grow from 1970 to 1980 in active (15-64) and aged dependent (65+) populations, but show losses for the child (0-14) population. This will be explained by continued fluctuating lower fertility and the small number of children under age 5 now resident. This fact has significance for agencies responsible for educational, recreational, religious and other programs oriented to youth.

7. Rural farm residence areas and hamlets under 1,000 generally will show additional losses in all age categories from 1970 to 1980, as persons continue to relocate to urban centers or communities of 1,000 to 2,500 inhabitants, suggesting that planning programs for regional rural development should be given maximized priority.

APPENDICES

APPENDIX TABLE I

Estimated annual crude birth rates for South Dakota, 1960-1970*

Year†	Estimated Population	Recorded Live Births	Crude Birth Rate
1960	683,000	17,594	25.8
1961	693,000	17,551	25.3
1962	705,000	17,158	24.9
1963	708,000	16,711	23.6
1964	701,000	15,627	22.3
1965	692,000	13,692	19.8
1966	683,000	12,534	18.4
1967	671,000	11,424	17.3
1968	669,000	11,408	17.1
1969	668,000	11,441	17.1
1970	666,000	11,717	17.6

*Bureau of the Census, "Preliminary Intercensal Estimates of States and Components of Population Change, 1960 to 1970," *Current Population Reports: Population Estimates and Projections*. Washington, D. C.: Bureau of the Census, U. S. Department of Commerce, Series P- 25 No. 460, July 7, 1971, p. 8; South Dakota Department of Health, *South Dakota Public Health Statistics, Annual Statistical Report, 1970*. Pierre, S. D.: South Dakota Department of Health, Division of Public Health Statistics, 1970, p. 8.

†For years 1960 through 1969, assumed to be mid-year population as of July 1. For 1970, enumerated as of April 1, 1970. Population given in thousands.

APPENDIX TABLE II

South Dakota infant deaths and death rates, 1960-1970*

Year	Number Infant Deaths	Estimated Annual Mortality Rate
1960	494	28.1
1961	409	23.3
1962	434	25.3
1963	414	24.8
1964	350	22.4
1965	315	23.1
1966	309	24.6
1967	252	22.1
1968	233	20.4
1969	226	19.8
1970	228	19.5

*South Dakota Department of Health. *South Dakota Health Statistics, Annual Statistical Report, 1970*, Pierre, S. D.: South Dakota Department of Health, Division of Public Health Statistics, 1970, p. 29.

APPENDIX TABLE III

Child deaths and death rates, 1960 and 1970*

Year	Total Population, Age 0-4	Number Deaths, Age 0-4	Death Rate
1960	83,127	570	6.9
1970	54,258	274	5.0

*South Dakota Department of Health, *South Dakota Public Health Statistics, Annual Statistical Report, 1970*. Pierre, S. D.: South Dakota Department of Health, Division of Public Health Statistics, 1970, p. 8; also *South Dakota Annual Report, 1960, Department of Public Health Statistics*, Pierre, S. D.: South Dakota Department of Health, Public Health Statistics, 1960, p. 23.

APPENDIX TABLE IV

Estimated annual crude death rates for South Dakota, 1960-1970*

Year	Estimated Population	Recorded Deaths	Crude Death Rate
1960	683,000	6,616	9.7
1961	693,000	6,234	9.0
1962	705,000	6,577	9.4
1963	708,000	6,654	9.4
1964	701,000	6,599	9.4
1965	692,000	6,520	9.4
1966	683,000	6,576	9.6
1967	671,000	6,349	9.5
1968	669,000	6,532	9.8
1969	668,000	6,747	10.1
1970	666,000	6,547	9.8

*Cf., f.n., Appendix Table I.

APPENDIX TABLE V.

South Dakota marriages by residence status of bride and groom, 1961-1970*

Year	Total Marriages	Both South Dakota Residents	Groom South Dakota Resident	Bride South Dakota Resident	Both Non-Residents
1961	6,214	3,922	139	587	1,566
1962	6,954	3,956	151	627	2,220
1963	7,470	4,091	152	649	2,578
1964	8,055	4,057	156	682	3,160
1965	8,317	4,010	156	762	3,389
1966	8,517	4,129	164	759	3,465
1967	9,051	4,261	167	818	3,805
1968	10,347	4,736	208	813	4,590
1969	10,909	4,977	211	905	4,816
1970	11,034	5,128	177	861	4,868

*Cf., f.n., Appendix Table I.

APPENDIX TABLE VI.

Sums of squares and proportion of variance accounted for by the independent variables in order entered into the equation (order of importance)

Variable Number	Sum of Squares Accounted for	Percent of Proportion Reduced	Cumulative Proportion Reduced Step-wise	Regression Coefficient through Step 7
X_1	19261664.000	95.7	95.7	3.06068
X_2	67926.188	0.4	96.1	8.66572
X_8	147412.938	0.7	96.8	.67130
X_9	50448.973	0.3	97.1	–.00672
X_3	45302.508	0.2	97.3	.87817
X_4	114062.188	0.5	97.8	–.93001
X_5	51768.902	0.3	98.1	.02063
X_6	5659.461	0.0	98.1	----------
X_7	31.839	0.0	98.1	----------

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Other Publications in this Series

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